

National Aeronautics and  
Space Administration

# L A G N I A P P E

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John C. Stennis Space Center

June 23, 1999

## Stennis signs first dual-use contract

NASA's John C. Stennis Space Center celebrated the kickoff of the center's first "dual-use" technology project June 3.

The project involves NASA; Associated Technical Management Corp., of Texarkana, Texas; the Mobile County, Alabama, Board of Health; and the Environmental Protection Agency's Gulf of Mexico Program at Stennis in a collaborative effort toward the commercial development of NASA technology.

Dual-use projects are jointly-funded technology development partnerships in which NASA and an industry partner share the expense and risk in further development of a new product that will meet NASA's needs as well as commercial requirements, according to Kirk Sharp, NASA's technology transfer officer at Stennis.

The cooperative effort between NASA and the corporation began after the company learned about NASA's technology at a 1998 seminar for small businesses sponsored by Louisiana Congressman Jim McCrery, the Louisiana Business and Technology Center, and the Division of Continuing Education and Public Service at Louisiana State University-Shreveport. The center, which operates the Louisiana Technology Transfer Office at Stennis, facilitated discussions between NASA and Associated Technical Management Corp., which led to negotiation of an exclusive license agreement.

"Joint projects such as this one are like Mom and apple pie," Stennis Space Center Director Roy Estess said. "Industry loves them. Congress loves them, and the taxpayers get second-order, third-order — even fourth-order use of their original investments in technology," Estess said.

The project involves NASA-developed technologies that have the capability to detect plant stress up to 16 days before it is visible to the human eye. Originally developed by NASA scientists Bruce Spiering and Greg Carter of Stennis' Earth System Science Office, the Multispectral Telescope and Portable Video Imager will be further refined under the joint project to

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More than 65 representatives from government and private industry met at Stennis Space Center June 4 to take part in an Executive Review Board and quarterly review for the X-33/RLV Program. The representatives came to Stennis because the X-33 program is about to enter a critical phase — testing of the XRS-2200 Linear Aerospike Engine at Stennis. Pictured from left is Marshall Space Flight Center Director Art Stephenson, Kennedy Space Center Director Roy Bridges, NASA Deputy Associate Administrator for Aero-Space Technology Gary Payton, Johnson Space Center Associate Director and astronaut John Young, Lockheed Martin Skunk Works Vice President for X-33/VentureStar™ Cleon Lacefield, VentureStar™ Company President Jerry Rising, Stennis Space Center Director Roy Estess, NASA's X-33 Program Manager Gene Austin, and Stennis Space Center's X-33 Project Manager Steve Nunez.

## X-33 leaders meet as project progresses

Stennis Space Center hosted the X-33/Reusable Launch Vehicle (RLV) Program Executive Review Board and quarterly review June 4.

The X-33 is the flagship prototype in NASA's Space Transportation Technology Enterprise and is being developed under a cooperative agreement that began July 2, 1996, between NASA and Lockheed Martin Skunk Works of Palmdale, Calif.

The wedge-shaped vehicle is a half-scale prototype of a reusable launch vehicle that Lockheed Martin calls VentureStar™. The company hopes to develop the full-scale VentureStar™ early in the next century.

The prototype is making increasingly larger steps toward becoming a fully functioning and flying reality.

This year, the X-33 Technology Demonstration Program moved into an intensive period of final tests and validations as the projected rollout date of January 2000 draws near.

Two major elements and milestones of the vehicle assembly — two liquid hydrogen fuel tanks and the aerospike engine — have made significant progress toward integration into the vehicle.

The composite liquid hydrogen tank for the right side of the vehicle arrived April 28 at Marshall Space Flight Center in Huntsville, Ala., from Lockheed Martin's Sunnyvale, Calif., facility. After completion of modifications on a stand at Marshall, the tank will undergo testing. The composite liquid hydrogen fuel tank for the left side of the X-33 completed its final cure cycle in the autoclave in Sunnyvale. After final preparations, the tank will be flown to Marshall for testing in late July or early August. The tanks them-

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## LAGNIAPPE Commentary

### *If we can go to the Moon ...*

Next month, Americans will celebrate the 30th anniversary of the first landing of humans on the Moon. Neil Armstrong stepped off the spacecraft Eagle July 20, 1969, onto the Moon, marking one of humankind's greatest technological achievements.

Almost as soon as Armstrong and Buzz Aldrin completed their brief exploration of that heavenly body and returned with their partner, Mike Collins, to the adulation of millions of people all over their home planet, there were some critics who began raising the question: "If we can go to the Moon, why can't we solve the energy crisis, cure cancer and eradicate poverty?" And, ever since that triumphant day 30 years ago, many other problems have arisen, and the same questions have been asked, "If we can go to the Moon ..."

On this significant anniversary of that great 20th century achievement, it is important to review our country's technological progress and once again revisit that old nagging question.

In addition to the Apollo lunar landing program being a centerpiece in the Cold War with the Soviet Union, President John Kennedy, Vice President Lyndon Johnson and practically every member of Congress also saw the Moon program as something with a much broader and more laudable mission.

The Apollo program was fashioned to broaden the technological prowess of the American people. Going to the Moon was meant to open the door to new invention and give us the tools to mold a better way of life, not only for Americans, but also for people all around the world as well.

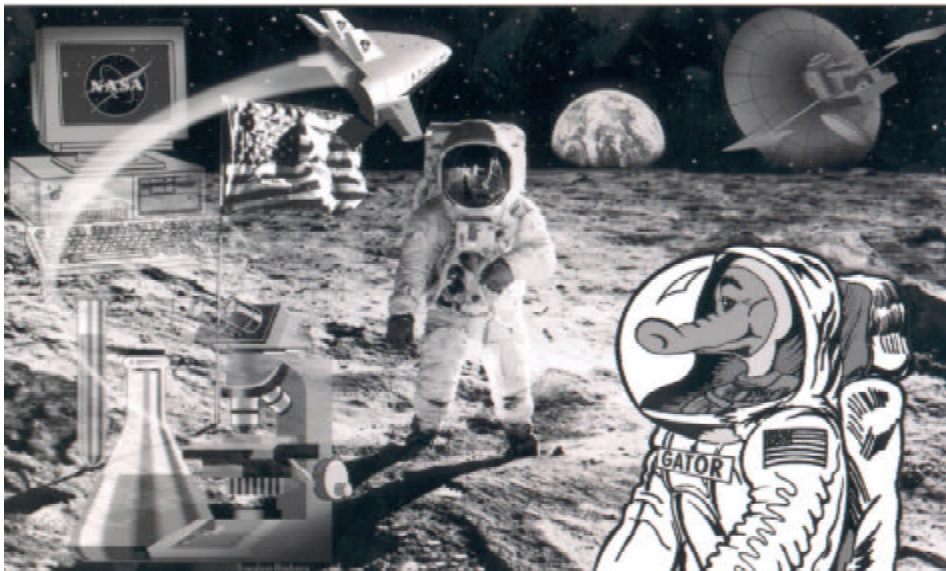
From the very beginning of the Apollo program, engineers and scientists were constantly looking for additional ways to use and apply their new-found technology.

These "spinoffs" and applications of space technology found their way into practically every aspect of our society. Space technology was quickly recognized and used in medical research, the booming computer industry, the utilization of satellites, the automotive industry, development of new materials, communications and for the national defense.

In fact, it has been proven that you can't go through a day without being touched several times by these products of the space age. And, of course, these innovations would not have been possible had it not been for the Apollo Moon program to discover and drive the technology.

And, besides the obvious technical advancements to come from the Moon program, there was a "spirit of Apollo" that swept across the nation and gave the American people a renewal of spirit and determination. There was a great lifting of the self-confidence of our nation that came from the very phrase many critics laid at our feet: "If we can go to the Moon, why can't we ...?" Well, our people said, "Look here, we can go to the Moon, and we can do these other things, too. And much more!"

M.R.H.



## NASA NEWSCLIPS

**Nobel Prize winner selected to head NASA's Astrobiology Institute**—NASA selected Dr. Baruch Blumberg, distinguished professor, researcher, biochemist and winner of the 1976 Nobel prize for Physiology or Medicine, as director of NASA's Astrobiology Institute (NAI). NAI is an institution without walls, a virtual organization comprised of NASA centers, universities and others dedicated to studying the origin, evolution, distribution and destiny of life in the universe.

**Goldin selects Olsen as chief scientist**—NASA Administrator Daniel Goldin recently selected a biologist, Dr. Kathie Olsen of the National Science Foundation, as the space agency's chief scientist.

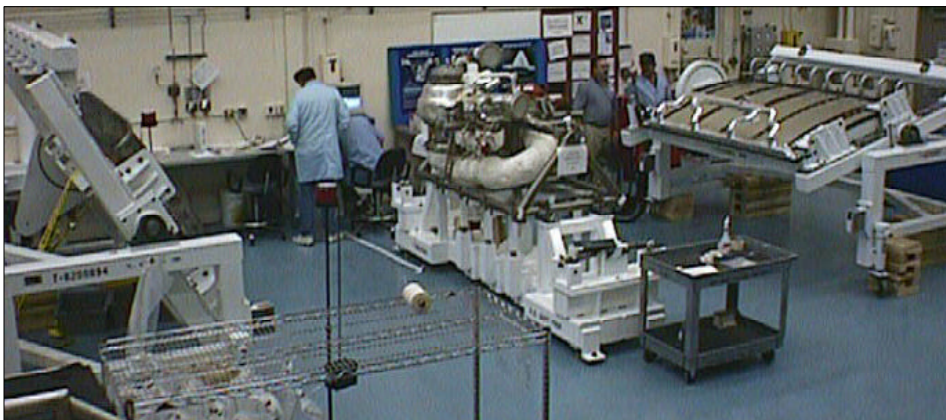
Olsen will serve as the Administrator's senior scientific advisor and principal interface with the national and international scientific community. She will be responsible for ensuring that NASA programs are universally regarded as scientifically and technologically valid.

**Doctors practice medicine from a distance**—Doctors at five distant sites in the United States, using 3-D medical images carried by a high-capacity computer network, demonstrated how to use NASA telemedicine to diagnose patients, practice operations and train.

The NASA telemedicine system, which was demonstrated at NASA's Ames Research Center at Moffett Field in California, has potential for improving health care at the far corners of the Earth by linking remote sites with the best medical minds and facilities.

During the demonstration, physicians used 3-D, scanned images of patients' hearts, skulls and other body parts. On computer screens, doctors at the five sites saw every procedure in stereo 3-D as each physician manipulated images of the virtual patient.

The "Virtual Collaborative Clinic" linked physicians from the Cleveland Clinic, participating at the Glenn Research Center in Cleveland, Ohio; Stanford University Medical Center in Stanford, Calif.; Salinas Valley Memorial Hospital in Salinas, Calif., interacting from the University of California, Santa Cruz; the Northern Navajo Medical Center in Shiprock, N.M.; and Ames. The concept and software are under development at Ames' Center for Bioinformatics.



Technicians at the Boeing Rocketdyne Propulsion and Power assembly facility in Canoga Park, Calif., prepare to assemble the XRS-2200 Linear Aerospike Engine. Shown in the foreground at left is one of the two thruster arrays that will provide propulsion for the engine. In the center, is a powerpack that was tested at Stennis. On the right, is one of the two ramps that will direct the thrust of the arrays. The aerospike will power the X-33 technology demonstrator, a half-scale prototype for a single-stage-to-orbit vehicle called VentureStar™. Rocketdyne plans to ship the engines to Stennis by the end of this month.

## X-33...

(continued from Page 1)

selves will be installed inside the X-33, allowing for a fully reusable vehicle.

In April, Stennis Space Center successfully completed more than 1,500 seconds of testing on three engine powerpacks. When tests on the powerpacks, which consist of flight ducts and plumbing that make up the inside of the aerospike engine, were completed, they were shipped back to Boeing Rocketdyne in Canoga Park, Calif., for installation into the engines.

Modifications to the A-1 test stand at Stennis continue in order to accommodate testing of a full-scale aerospike engine. Stennis is expected to take delivery of the first engine in early July with 25 tests scheduled to begin in late July or early August.

The first dual-engine configuration is expected to arrive at Stennis in December, with the first-dual engine firing scheduled to take place in January 2000.

Other X-33 systems and items that have recently undergone and are currently undergoing validation are the launch umbilical lines and connections, flight software and the metallic thermal protection panels.

A full-scale, single-stage-to-orbit reusable launch vehicle is expected to dramatically increase reliability and lower the cost of putting a pound of payload into space from \$10,000 to \$1,000. This would create new opportunities for space access and significantly improve U.S. economic competitiveness in the worldwide launch marketplace. NASA will be a customer - not the operator - of the commercial reusable launch vehicle.



John C. Stennis Space Center Director Roy Estess, left, accepts a check from Don Sumner, chief executive officer of the Associated Technical Management Corp. of Texarkana, Texas for the exclusive license for commercial marketing of Stennis-developed technology involving plant stress. NASA's Technology Transfer Officer Kirk Sharp, right, assisted in securing the license, which launched the first dual-use project for Stennis. Other partners in the project include the Mobile County, Ala., Health Department and the Environmental Protection Agency's Gulf of Mexico Programs at Stennis.

## New venture blooms from tech briefing

The long drive to NASA's John C. Stennis Space Center in Mississippi last June led Don Sumner, chief executive officer of Associated Technical Management Corp., a small Texas-based technologies consortium, into a world of possibilities beyond his dreams. Sumner, a hazardous waste manager and environmental risk assessor, attended one of a series of technology commercialization briefings hosted by the NASA Technology Transfer Office at Stennis for a portable video imager.

"I am not a real sophisticated kind of guy," Sumner said in his full-bodied Texarkana accent. "I have done my share of dreaming, but I never thought of myself as an innovator. I certainly won't be confused with a rocket scientist."

However, when he saw a demonstration of NASA-developed technology involving plant stress, he knew his experience, background and daydreams had jumped feet first into the future.

As Sumner was aware past attempts to detect plant stress had been too labor intensive to be cost effective. He believed if an efficient method of analyzing plant stress could be designed to work with the farmer or forester, as a matter of routine, the resulting savings in harvest time, fertilization costs and potential crop loss could potentially double or triple profits.

"I just knew, in my heart, there ought to be a way to adapt the Stennis-technology so that

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Partially silhouetted over clouds and a wide expanse of ocean waters, the unmanned International Space Station moves away from the Space Shuttle Discovery. An electronic still camera was aimed through aft flight deck windows to capture the image.

## Discovery supplies space station and makes safe landing

Discovery's astronauts glided to the 11th night landing in shuttle program history early June 6, landing at 1:03 a.m. Central time to wrap up a 4-million-mile mission to resupply the International Space Station.

Discovery's seven astronauts successfully transferred almost two tons of material and equipment to the International Space Station to be used by the first residents of the outpost when they arrive next year.

Early in the flight, space walkers Dan Barry and Tammy Jernigan installed another 700 pounds of equipment on the exterior of the station to be used during future assembly missions.

A total of almost 75 gallons of water was left aboard the station for the first resident crew, which is comprised of Expedition Commander Bill Shepherd and Russian cosmonauts Yuri Gidzenko and Sergei Kirkalev.

The astronauts conducted some additional work: installing parts of a wireless strain gauge system that will help engineers track the effects of adding modules to the station throughout its assembly, as well as cleaning filters and smoke detectors.

Discovery's thrusters were commanded to fire in a series of 17 bursts to raise the space station's altitude by about five to six miles. That reboost maneuver will enable the station to be in the correct altitude for the arrival of the Russian Zvezda service module late this year. It will be the next component to be linked to the growing station complex and the living quarters for the first permanent occupants of the orbital facility.

## Director's Dialogue

*from Center Director  
Roy Estess*



### Safety is critical to our future

Safety – of people, of assets and of the environment – is critical to our future. We will not ultimately be successful in propulsion testing, commercial remote sensing, Earth science, or in the management of this “federal city,” unless we are truly committed to the safety of our team members and are dedicated stewards of Stennis Space Center’s assets, our customers’ assets and the environment. It’s that simple.

Stennis and NASA have an enviable safety record when compared to other government organizations and companies. But, given the importance to our future, it’s not nearly good enough! As we approach the activation of very complex, high-energy test facilities worth well over \$100 million, it’s time to move our safety effort in all areas up to a new level of excellence, not just improve it. To do this, we’ve hired the DuPont Co. as coach and facilitator; they’ll start in July. DuPont is a world leader in safety, having initiated it almost 200 years ago in its origin as America’s maker of gun powder...one mistake, and no employees, no plant, no company. Sound familiar?

A key tenet of the DuPont approach is that safety is everyone’s job: managers, co-ops, technicians, secretaries . . . everyone. Safety professionals are available to guide and advise, but it’s our job. Safety is 24 hours a day, seven days a week, off the job as well as on; it’s an attitude, not a program. I personally look forward to learning from DuPont how to make this a reality here at Stennis; I ask that you do too. We need it for the future. Bottom line, safety is both good business and is good for business! Let’s move up to the next level of safety excellence.



Mississippi State Senator Tim Johnson, back row, fourth from left, visited Stennis Space Center recently with a group of future leaders from El Salvador. Johnson wanted to show the visitors that cutting-edge technology exists in Mississippi and that Stennis Space Center is at the forefront of that technology. The group spent one week in Mississippi and one week in Illinois.



NASA celebrated Old Timers' Day June 11 with a Shrimp Boil at the Cypress House. An estimated 500 NASA employees and contractors, old and new, enjoyed an afternoon of fellowship, great food and stories of the good old days. From left, Matthew Fontaine Maury Library summer worker, Brent Archer of Slidell visits with former Stennis Space Center Director Jerry Hlass of Long Beach, Deputy Propulsion Test Directorate Lead for the Fastrac Engine program engineer Glen Doughty of Huntsville, Ala., and former NASA employee William Matkin of Pass Christian.

## Coast residents get ready for yet another hurricane season

As another year rapidly passes, the annual watch for hurricanes begins. Officials with the National Hurricane Center keep a watchful eye for tropical storm development in the Atlantic Ocean, Caribbean Sea and the Gulf of Mexico.

Hurricane season, June 1 through Nov. 30, peaks between mid-August and October. Most hurricanes make landfall during the month of September.

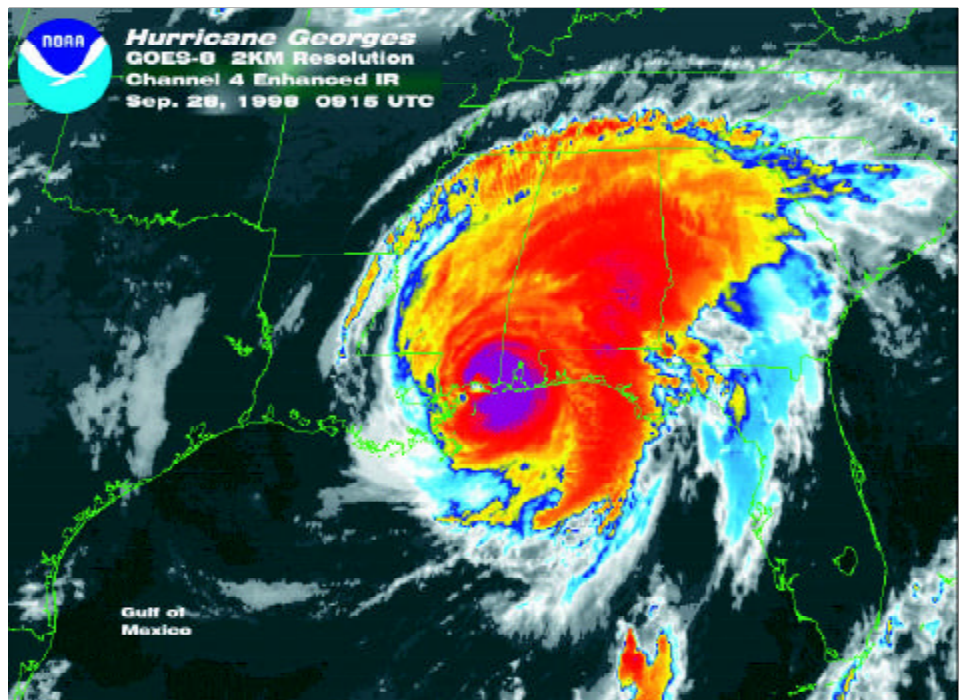
Hurricanes Andrew, in 1991, and Camille, in 1969, were August storms. Last year's major hurricane — Georges — struck the Mississippi Gulf Coast Sept. 28.

Here are some important elements of a hurricane plan to ensure readiness:

1. Have a safe place to ride out the storm.
2. Have a plan for protecting your home and property.
3. Devise a way to store water for use after a hurricane. Water systems may become contaminated and undrinkable following a hurricane.
4. Don't be confused about hurricane terms. Know the different stages of hurricane development:

**Tropical Disturbance:** a system of clouds, showers and thunderstorms in the tropics that maintains its identity for 24 hours or more.

**Tropical Depression:** a tropical disturbance that develops closed circulation



**Radar imagery of Hurricane Georges as he strikes the Mississippi Gulf Coast near Pascagoula Sept. 28, 1998.**

(counterclockwise winds around a center of low pressure,) with maximum sustained winds of 39 mph or less.

**Tropical Storm:** a system given a name by the National Hurricane Center. Maximum sustained winds: 39-73 mph.

**Hurricane:** sustained winds of at least 74 mph, but winds can be much stronger. Hurricanes are categorized on a scale of one to five based on wind speed, barometric pressure and resultant destructive potential.

Forecasters issue a **Hurricane Watch** when a tropical storm or hurricane may threaten an area within 24 to 36 hours. **Hurricane Warnings** indicate that a tropical storm or hurricane will strike within 24 hours.

When tropical storm or hurricane conditions threaten the Mississippi coast, Stennis has four warning conditions. The warnings are declared when the National Weather Service advises destructive force

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## Booth tries to understand and improve life on Earth

NASA does more than explore space — it also uses space technology to look back at the Earth in an effort to improve our understanding of biological, chemical and physical processes of the Earth.

NASA's Dr. Greg Booth, a research scientist in the Earth System Science Office at Stennis Space Center, is working to add to humankind's knowledge about these processes.

The New Orleans native and now Slidell, La., resident, studies particle transport in near-shore environments, such as bays, estuaries and the adjacent continental shelf. Research of this kind is used to understand the transport and fate of materials, such as sediments and contaminants, which are primarily delivered to coastal environments through continental runoff.

"I use tools from the fields of geochemistry, remote sensing and environmental modeling to look at the time scales and processes involved with the transport of materials in coastal environments," Booth said. "By coupling discrete geochemical measurements in bottom sediments with synoptic remotely sensed information about the water column, we gain a large-scale understanding of how a particular coastal system responds to forcing agents, such as cold front passages and tropical storms. This information is important for constraining biogeochemical budgets and determining the pathways of pollutants in the environment."

Booth grew up in Dexter, a small town

*"My job allows me to pursue scientific questions that I find very interesting."*

Dr. Greg Booth



in southeast Missouri, and in 1988 earned a bachelor's degree in geology from Southeast Missouri State University in Cape Girardeau, Mo.

He then accepted a job as a research technician with the Louisiana Universities Marine Consortium in Cocodrie, La. In 1991, he entered graduate school at Louisiana State University (LSU) in Baton Rouge, to work on a master's degree with focus on the aquatic geochemistry of uranium. He received his master's degree in 1994 and immediately started working towards a doctorate at LSU, which he completed earlier this year.

Shortly after beginning his doctoral research and while still working as a research technician for the marine consortium, Booth became involved in a NASA-funded coastal research project.

"During field sampling trips, I began interacting with Dr. Richard Miller, chief of the Earth System Science Office at Stennis," Booth said. "Through this interaction, I became

### SSC Employee Profile



interested in the application of remote sensing in conjunction with the biogeochemical work that I was already pursuing."

In 1997, Booth accepted a research scientist position at Stennis Space Center.

"NASA was interested in a marine biogeochemist with a coastal focus who was also familiar with remote sensing," he said.

This up-and-coming, bright, new scientist really enjoys the Earth sciences he gets to research at the space center.

"My job allows me to pursue scientific questions that I find very interesting," Booth said. "I like working at Stennis because of the resources available to us. Also, the proximity of Stennis to the Gulf coastal environments, as well as to one of the ten largest rivers in the world (the Mississippi River) is certainly an attraction."

Booth lives in Slidell with his wife, Lori, and their two sons, John Garrett, three years old, and Jacob Scott, four months old. In his spare time, Booth enjoys working around the house, fishing, reading and taking his sons on outings to the Mississippi beaches and the children's museum and zoo in New Orleans. When they have time, Booth and his wife like to scuba dive — both are certified scuba divers.



Stan Williams, right, regional representative for the United States Secretary of Education, and Judy Harwood, center, deputy regional representative, recently visited to receive a briefing on the education programs being conducted by the NASA Education and University Affairs Office at Stennis. The two-day visit included overviews of the Gulf Coast Education Initiative Consortium, Workforce Development Education and Training, and the Mars Millennium Project, a program in which school children will design Martian habitats. Pictured left is Dr. David Powe, chief of Education and University Affairs Office at Stennis Space Center.

## Educator Resource Center workshops

### It's All in the Game!

**June 29 or June 30**

#### For teachers of grades K-3

Teachers will find ideas for learning games and activities that will promote learning across the curriculum. Participants will be provided with materials to complete several games for use in their classrooms at the start of the new school year.

### Holidays on the Internet

**June 30**

#### For teachers of grades K-6

Educators will use the Internet to discover lesson plans and activities that explore the origins of many holidays that we celebrate.

**For more information, call the NASA Educator Resource center at 1-800-237-1821 (select option two) in Mississippi and Louisiana only or (228) 688-3338 between the hours of 7 a.m. and 3 p.m., Monday through Friday.**

## DUAL-USE...

(continued from Page 1)

develop an airborne capability.

"We will research methods of fabricating a unit to be mounted on a fixed-wing airplane to survey areas along the Gulf," said Don Sumner, chief executive officer of the corporation.

"And, we will aggressively work toward bringing this technology to the agricultural and forestry markets, as well."

Two applications to be researched initially will involve the participation of the Mobile County, Alabama, Health Department and the EPA's Gulf of Mexico Program at Stennis. These agencies seek to evaluate the technology's ability to detect leaking raw sewage into the environment near Mobile Bay and to detect algae blooms in the Gulf of Mexico, which may indicate water pollution and oyster bed contamination.

EPA's Gulf of Mexico Program, which targets areas in the five Gulf Coast states to improve the environmental health of the Gulf, sees the potential of the project as one that reaches goals of protecting human health.

"This project shows how small efforts benefit the larger picture," said Bryon Griffith, the program's deputy director.

"This is the first dual-use project for Stennis Space Center," Sharp said. "Leveraging dollars from the partnership and assuring commercial use of our technology is the essence of NASA's Commercial Technology Program. Bringing businesses in up-front is why dual-use projects can succeed. We are very proud of this activity."



The Naval Oceanographic Office's Pamela Stenum, right, is being prepared to donate blood by an American Red Cross technician during a recent blood drive at Stennis Space Center. The total number of units donated by Stennis personnel was 253.

## TECHNOLOGY...

(continued from Page 3)

a farmer could take readings of his crops from his tractor as he worked his fields," Sumner said. "Being able to expand the imager's flexibility would provide farmers with a two week lead to respond to whatever the crops needed to increase yields."

Sumner imagined other modifications to the Stennis plant stress prototype that would enable it to be placed on all-terrain vehicles for environmental use; on helicopters to cover vast expanses of timber and forests; and, eventually, on fixed-wing aircraft to evaluate larger or more distant locations. He thought of adding ground-penetrating radar to the device to sense underground leaks in gasoline storage tanks or in sewerage lines. Additional lenses and filters would enable the device to read gases or vapors.

Less than one year later, Sumner returned to Stennis to sign a license agreement for the center's first dual-use technology transfer project. Also, he presented Stennis Space Center Director Roy Estess with a check for the exclusive license for the commercial development of the portable video imager and multispectral imaging system.

The portable video imager detects plant stress before it becomes visible to the human eye. Plant stress is the reaction of plants to environmental conditions that are unfavorable to growth, such as a lack of sufficient nutrients, inadequate watering, disease or insect infestation. Researchers at Stennis have found, in many cases, previsible signs of stress by measuring far-red and infrared light waves. They constructed a successful prototype and, through the NASA Technology Transfer Office, filed a patent application.

Projections indicate that Sumner and what is now the Associated Technical Management Corp., of Texarkana, Texas, a consortium created to research and further develop applications of the imager, could gross approximately \$20 million over the next five years from the commercial use of NASA technology.

"The story behind the transfer of this technology to Associated Technical Management Corp., is a textbook example of NASA's commitment to encouraging broader use of NASA-developed technologies in the U.S. business community," said Kirk Sharp, NASA's technology transfer officer at Stennis.

Sumner also credits the success of his corporation's efforts to NASA's commitment to transferring technology. "I can't express the excitement we feel and the possibilities that are before us," Sumner said.

## Safety Corner

Information provided by  
NASA's Safety Reliability  
and Quality Assurance Office

## Back belt safety

Recently, back support belts have been introduced to general industry after a history of use in the sport of weight lifting. Unfortunately, there is a lack of evidence that these belts work for industry.

In a publication called, "Workplace Use of Back Belts: Review and Recommendations," the National Institute for Occupational Safety and Health (NIOSH) concluded, after looking at all peer-reviewed scientific literature on back belts and injury, that because of the limitations of the studies, the results cannot be used to support or refute the theory that back belts reduce injury.

Even scientists differ as to why they believe back belts might work. Scientists theorize that back belts:

- Reduce forces on the spine
- Reduce spine motion
- Reduce bending motion
- Increase abdominal pressure
- Remind workers to lift properly

NIOSH found that evidence was lacking or inconclusive. NIOSH did admit that with the lack of evidence, they could not find any harmful effects of wearing back belts.

With its findings, NIOSH made the following recommendations:

- Back belts should not be used to prevent injuries,
- Workers must be aware of the lack of scientific evidence,
- Companies should begin to implement a comprehensive ergonomics program.

## QUICK LOOK

■ **The NASA Exchange at Stennis** is offering discount tickets to various theme parks and attractions including Disney World, Sea World, Universal Studios, Busch Gardens, AstroWorld in Houston, Six Flags Over Georgia and more. Discounts typically run from 12 to 25 percent with several ranging from 44 to 50 percent. For additional information and details on destinations, contact Alyce Moran in Room 330, Building 1100 or call, Ext. 7227.

■ **The SSC Recreation Association Gun and Archery Club** is taking applications for new members. The club features education, training and several monthly competitions on its rifle, pistol and skeet ranges. For more information, call Kevin Dial at (228) 689-8009 or Jim Biles at Ext. 1020.

■ **The Stennis Space Center Visitors Center** has kicked off its 1999 Summer Reading Program. Nineteen sessions are scheduled at area libraries and Vacation Bible Schools. The Summer Reading Program is free and open to all children in grades K-6. For more information, call Stennis Space Center at (228) 688-2370 or 1-800-237-1821 (select option one) in Louisiana and Mississippi.

■ **A six-man team from Stennis Space Center recently won the Federal Cup Golf Tournament.** The Federal Cup is an annual golf tournament with teams from federal agencies in the three coastal counties of south Mississippi. The winning Stennis team members were Tim Donohoe, Jeff Nabors, Robert Taylor (JCWS), Charlie Broussard, Rick Malley (LMSO) and Randy O'Neal (NOLA Computer Services).

## HURRICANE...

(continued from Page 5)

winds are expected to reach the Mississippi Gulf Coast:

**Condition 4 (Alert)** – The hurricane is expected to hit within 72 hours. A general state of readiness will be assumed and the Stennis Space Center Emergency Operations Center in Building 1100 will open on a limited basis as required.

**Condition 3 (Alert)** – The hurricane is expected to hit within 48 hours. The majority of storm preparations should be accomplished during this period. The Emergency Operations Center will open on a limited basis as conditions dictate.

**Condition 2 (Emergency)** – The hurricane is expected to hit within 24 hours. Final emergency preparations will be completed and the state of readiness reported to the Stennis Emergency Director. Conditions will be assessed and decisions will be made regarding employee dismissal and site closure. The Emergency Operations Center will assume 24-hour operations.

**Condition 1 (Emergency)** – The hurricane is expected to hit within 12 hours. Shelters will open for employees and their families.

Employees and their dependents will usually be assigned to shelters in the employee's normal work area. If their area has not been designated as a shelter, one will be assigned.

Primary shelters will be located in Buildings 1100, 2101, 2204, 2201, 1000, 1002 and 1005. Backup shelters will be located in Buildings 1105, 1200, 8100, 2105 and 4995.

## LAGNIAPPE

*Lagniappe* is published monthly by the John C. Stennis Space Center, National Aeronautics and Space Administration. Roy Estess is the center director, Myron Webb is the public affairs officer, and Lane Cooksey is the news chief. Comments and suggestions should be forwarded to the Lagniappe Office, Building 1200, Room 208, Stennis Space Center, MS 39529, or call (228) 688-3583.

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